

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
2 June 2005 (02.06.2005)

PCT

(10) International Publication Number  
**WO 2005/049204 A2**

(51) International Patent Classification<sup>7</sup>: **B01J 41/00**

(21) International Application Number:  
PCT/US2004/020704

(22) International Filing Date: 25 June 2004 (25.06.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/507,035 29 September 2003 (29.09.2003) US

(71) Applicant (for all designated States except US): **E.I. DUPONT DE NEMOURS AND COMPANY** [US/US];  
1007 MARKET STREET, WILMINGTON, DE 19898 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **CHOUDHURY, Biswajit** [CA/CA]; 1005-175 Bath Road, Kingston,

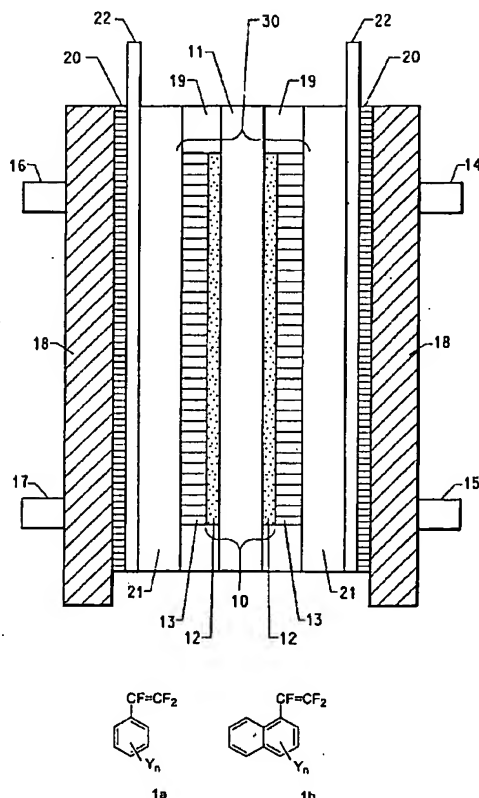
Ontario K7M 7K9 (CA). **ROELOFS, Mark, Gerrit** [US/US]; 514 Hemlock Drive, Hockessin, DE 19707 (US). **YANG, Zhen-Yu** [US/US]; 177 Thompson Drive, Hockessin, DE 19707 (US).

(74) Agent: **FICKES, Daphne, P.; E. I. DU PONT DE NEMOURS AND COMPANY, LEGAL PATENT RECORDS CENTER**, 4417 Lancaster Pike, Wilmington, DE 19805 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

[Continued on next page]

(54) Title: **TRIFLUOROSTYRENE CONTAINING COMPOUNDS GRAFTED TO BASE POLYMERS, AND THEIR USE AS POLYMER ELECTROLYTE MEMBRANES**



(57) Abstract: A fluorinated ion exchange polymer prepared by grafting a monomer on to a base polymer, wherein the grafting monomer is selected from the group consisting of structure 1a, structure 1b and mixtures thereof, (INSERT 1a and 1b HERE) wherein Y is selected from the group consisting of  $-\text{R}_f\text{SO}_2\text{F}$  (sulfonyl fluoride),  $-\text{R}_f\text{SO}_3\text{M}$  (fluorosulfonic acid or salt),  $\text{R}_f\text{SO}_2\text{NH}_2$  (fluorosulfonamide), and  $-\text{R}_f\text{SO}_2\text{N}(\text{M})\text{SO}_2\text{R}_f^2$  (imide); wherein M is H, an alkali cation, or ammonium; and  $\text{R}_f$  and  $\text{R}_f^2$  groups are perfluorinated or partially fluorinated, and may optionally include ether oxygens; and n is between 1 and 2 for 1a, or n is between 1 and 3 for 1b. These ion exchange polymers are useful in preparing catalyst coated membranes and membrane electrode assemblies used in fuel cells.



(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

— without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.